

Sutureless Laparoscopic Ventral Hernia Repair in Obese Patients

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ABSTRACT

Background and Objective: Transfascial sutures (TFS) are a standard component of laparoscopic ventral herniorrhaphy (LVHR) that contribute to the durability of repair, but also pain and, resultantly, hospital stay. We sought to examine LVHR without TFS in obese patients with small abdominal wall hernias.

Methods: Between September 2002 and December 2007, 174 patients underwent LVHR at Yale-New Haven Hospital. Patients with BMI $>30\text{kg/m}^2$ and small primary abdominal wall hernias were eligible for repair without TFS. Correlation between BMI, defect surface area, operative time, and postoperative stay was assessed.

Results: Fourteen patients underwent LVHR with no TFS, 2 with normal BMI and recurrent hernia after open repair and 12 with BMI $>30\text{ kg/m}^2$ and primary small hernia. Mean age was 38.8 years. The average defect size was 5.3cm^2 ; mean operative time (OT) was 42 minutes. Eleven patients (92%) were discharged home the day of surgery. No infectious or bleeding complications occurred. One patient required chronic pain management, and 8 patients (67%) developed seromas that resorbed spontaneously. There was no hernia recurrence at 7-month follow-up.

Conclusion: LVHR is feasible without TFS provided the hernia defect is small. Surgery can be performed on an outpatient basis in obese individuals with minimal postoperative morbidity.

Key Words: Incisional hernia, Ventral hernia, Transfixing sutures, Obesity.

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DOI: 10.4293/108680811X13022985131859

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INTRODUCTION

Ventral hernia is a common complication after open abdominal procedures with an incidence of approximately 10%.¹ In spite of the high frequency of occurrence of such a surgical complication, no standard protocol or technique exists for the surgical repair. Implementing an open versus a laparoscopic approach, mesh placement (underlay vs. overlay) and the use of transfascial sutures (TFS) are subject to variation in different surgical practices. In our practice, we consider TFS a standard component of laparoscopic ventral herniorrhaphy (LVHR), because these sutures augment the durability of the repair; however, studies have shown that TFS also contributes to postoperative pain² and, resultantly, prolonged hospital stay. Although studies have shown that obesity is not a contraindication to LVHR,³ the role of TFS in this particular population is not well studied. We sought to examine LVHR without TFS in obese patients with small abdominal wall hernias.

METHODS

Between September 2002 and December 2007, 174 patients underwent LVHR at the Yale-New Haven Minimally Invasive Surgery Center. Patient demographics and perioperative data were entered into a prospective longitudinal database. Two patients with a normal body mass index (BMI) underwent laparoscopic surgery to repair a small recurrence after open repair. Subsequently, 12 patients (5 females, 7 males) with a BMI $>30\text{kg/m}^2$ with small, primary abdominal wall hernias were repaired laparoscopically without the use of TFS. Mean age was 38.8 years (range, 22 to 64). The average defect size was 5.3cm^2 (range, 1.8 to 7.1). Due to the average defect size and obesity, primary repair (open or laparoscopic assisted with no mesh) was assessed to be of a higher recurrence risk and therefore was avoided. The main selection criteria to eliminate the TFS comprised a small primary defect in obese patients (BMI $>30\text{kg/m}^2$).

Operative Technique

The procedure was performed with the patient under general anesthesia in a standard supine position. All patients received preoperative IV antibiotics and 30mg of subcutane-

ous Lovenox (Sanofi-Aventis, Bridgewater, NJ) and compression boots for deep venous thrombosis prophylaxis. Pneumoperitoneum was achieved using a Veress needle technique to 15mm Hg. Two or three 5-mm radially dilating ports were used, and a 9-cm or 12-cm round Parietex composite mesh (Covidien, Norwalk, CT) was secured to the fascia by using only helical tacks obtaining at least a 4-cm overlap circumferentially (**Figures 1, 2, 3**).

All patients were discharged home the day of surgery with oral pain medication and instructed to gradually resume their normal activity. All patients were scheduled for follow-up within 2 weeks of surgery.

Patients were divided into 2 groups; group A (tacks, TFS) included patients who underwent LVHR with tacks and TFS (n=160), and group B (tacks, no TFS) included patients who

had a sutureless repair (n=12) (**Table 1**). The Student *t* test was used to analyze the differences between BMI, hernia defect surface area, operative time, and postoperative stay. P<0.05 was considered statistically significant.

RESULTS

This study included 174 patients who underwent LVHR at Yale New Haven Hospital. Two patients with a normal BMI underwent laparoscopic repair without transfascial sutures and were excluded from the analysis. Group A (tacks, TFS) included 160 patients with mean age of 49 years and mean BMI of 34.7kg/m². The average surface area of the hernial defect was 197.8cm². The mean operative time was 119 minutes. Group B (tacks, no TFS) included 12 patients with mean age of 38.8 years and

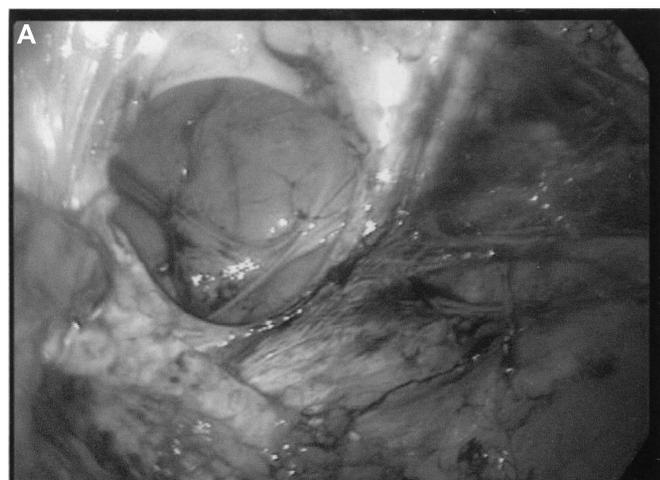


Figure 1. Laparoscopic view of incisional hernia (A). Parietex mesh placed with adequate margins (B).

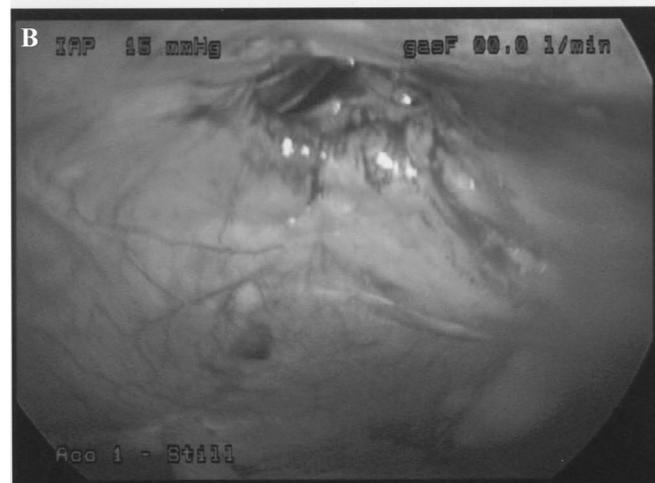


Figure 2. Ventral hernia with incarcerated omentum (A), fascial defect after omentum was reduced (B).

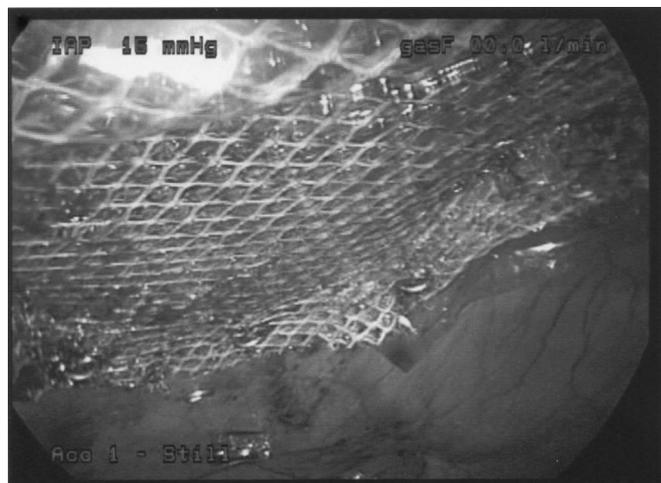


Figure 3. Parietex mesh placed with adequate margins.

Table 1.

Patient criteria in group A (tacks, TFS) and group B (tacks, no TFS)

	Group A (Tacks, TFS) (n=160)	Group B (Tacks, No TFS) (n=12)	P Value
Mean age (y)	49.0	38.8	0.02
Mean BMI (kg/m ²)	34.7	44.2	0.014
Mean defect area (cm ²)	197.8	5.3	<0.0001
Mean OT (min)	119	42	<0.0001

P<0.05 was considered statistically significant.

mean BMI of 44.2kg/m². The average surface area of the hernial defect was 5.3cm². The mean operative time was 42 minutes (**Figure 3**). The hernia defect was smaller in Group B as determined by the design of the study.

Among the 12 patients who underwent sutureless LVHR, 5 were females and 7 were males with an age range of 22 years to 64 years (average, 38.8). Eleven patients (92%) were discharged home on the same day of surgery after a 2-hour to 6-hour observation in the postanesthesia care unit. Discharge criteria included hemodynamic stability, controlled pain on oral medications, ability to void, and tolerating a liquid diet. A mean postoperative follow-up of 7 months revealed no infectious or bleeding complications. One patient (8.3%) required chronic pain management after the surgery, and 8 patients (67%) developed clinically palpable seromas that resolved spontaneously without opera-

tive intervention. There was no hernia recurrence in all 12 patients at the end of the 7-month follow-up.

DISCUSSION

Ventral abdominal wall hernias represent a common complication after abdominal surgeries with an incidence of approximately 10%. Traditionally, ventral hernia repair has been associated with a high recurrence rate, until the implementation of tension-free repair with a prosthesis.¹ The laparoscopic technique has yielded better surgical outcomes including decreased postoperative pain and fewer incidences of complications.² The classic technique of LVHR comprises placement of TFS to facilitate the mesh placement and lessen the risk of hernia recurrence.² A study by Ferrari et al³ demonstrated that obesity is not a contraindication to laparoscopic repair. The occurrence of a ventral hernia can be attributed to technical and patient-related factors, such as obesity, older age, male sex, malnutrition, ascites, pregnancy, and wound infections.⁴ A study by Sauerland et al⁵ included 160 patients who underwent incisional hernia repair with a recurrence rate of 11% at 24 months. The authors concluded that the risk for recurrence was not significantly affected by any of the clinical factors except obesity (after controlling the effects of age, sex, size of the hernia defect, and technique).

The clinical presentation ranges from asymptomatic to mild discomfort, pain, bowel obstruction, incarceration, and strangulation. Small hernial defects (≤ 2 cm in diameter) can be repaired primarily, but defects >2 cm in diameter should be repaired with a prosthesis, because the recurrence rate might be as high as 50% in primary repair.⁶ The various techniques of mesh placement in an open approach include extraperitoneal underlay (Stoppa), intraperitoneal underlay, inlay and onlay techniques. In the extraperitoneal underlay (Stoppa) technique, the mesh is sutured into the posterior rectus sheath with a 4-cm fascial margin, the closed peritoneum or omentum is positioned between the mesh and the bowel. In the inlay technique, the mesh is sutured to the edges of the fascia, while in the onlay technique, the mesh is sutured onto the anterior rectus sheath.⁷ Multiple retrospective and randomized studies analyzed the risk of hernia recurrence after open repair. The recurrence rate was highest with primary closure (no prosthesis), ranging from 2% to 54%.^{6,8,9} The inlay technique was also associated with a high recurrence rate of 44%.¹⁰ Numerous studies published in the medical literature show that the intraperitoneal underlay technique offers the lowest recurrence rate (2% to

10%).^{11–15} whereas in a randomized controlled study by Luijendijk et al,⁶ the recurrence rate after the extraperitoneal alternative was 20%. Overall, the hernia recurrence using the onlay technique ranges from 8% to 27%.^{10,16,17}

The first LVHR was reported by LeBlanc et al in 1993¹⁸ and since that time, the technique has been increasing in popularity. The laparoscopic approach recapitulates the intraperitoneal underlay technique. As previously noted, the intraperitoneal underlay technique is characterized by a lower recurrence rate, which is likely attributed to the physical forces applied by the patient’s intraabdominal pressure. The physics of repair are enhanced when this technique is applied laparoscopically, because the surrounding tissues, including the native blood supply, are not extensively disturbed compared to the open approach. In addition, small “Swiss cheese” fascial defects are easier to visualize laparoscopically, which allows for a

more complete hernia repair.¹⁹ Several studies compared the open approach with LVHR and concluded that LVHR is superior over the open alternative (**Tables 2 and 3**). A prospective study by Park et al³⁵ found fewer wound complications and earlier hospital discharge in the laparoscopic group. In 1999, Carbajo et al³⁶ studied the laparoscopic and open approaches in a prospective, randomized trial and concluded that the laparoscopic repair offers a lower rate of short- and long-term complications and a significantly shorter hospital stay. The advantages of the laparoscopic approach are well documented in the surgical literature with faster recovery, less pain, shorter hospital stay, better cosmesis, and less recurrence.^{37–41}

Although the use of TFS is not always mandatory in laparoscopic hernia repairs, the criteria for eliminating the TFS have not been established. With that in mind, several retrospective studies have shown that the hernia

Table 2.
Studies Implementing Tacks and TFS Technique in LVHR

Study	Year	Sample Size	Fascial Defect (cm ²)	BMI (kg/m ²)	OT (min)	Hospital Stay (days)	Recurrence %	Follow-up (months)
Ben-Hiam ²⁰	2002	100	39	NC	119	5	2	19
Berger ²¹	2002	150	96	34.5	90	9	2.7	15
LeBlanc ²²	2003	200	111	NC	84	1.3	6.5	36
Heniford ²³	2003	850	118	32	120	2.3	4.7	22
Chelala ²⁴	2003	120	NC	NC	75	3	0.8	10
Franklin ²⁵	2004	384	NC	NC	68	2.9	2.9	47
Ujiki ²⁶	2004	100	97	33	128	2	6	3
Bower ²⁷	2004	100	124	33.9	NR	NR	2	6.5
Perrone ²⁸	2005	116	115	35	146	1.7	9.3	22

NC=Not calculated.

Table 3.
Studies Implementing Tacks (no TFS) Technique in LVHR

Study	Year	Sample Size	Fascial Defect (cm ²)	BMI (kg/m ²)	OT (min)	Hospital Stay (days)	Recurrence %	Follow-up (months)
Chowbey ²⁹	2000	202	NC	NC	50	1.8	2	39
Gillian ³⁰	2002	100	NC	NC	NC	NC	1	27
Bageacu ³¹	2002	159	NC	NC	89	3.5	15.7	49
Kirshtein ³²	2002	103	175	NC	63	3.1	4	26
Carbajo ³³	2003	270	145	NC	85	1.5	4.4	44
Frantzides ³⁴	2004	208	173	NC	126	1.4	1.4	24

NC=Not calculated.

recurrence rate is not statistically different whether or not TFS was used in the course of the repair. Our study demonstrates the feasibility and durability of LVHR with no TFS in select cases, specifically small, primary, abdominal wall hernias, and that this technique remains durable even in obese patients (BMI > 30 kg/m²). In each case, the surgery was performed in a timely manner, with a very short postoperative stay, no wound complications, and no recurrences. Our study is limited by the small sample size and short-term follow-up (7 months). The short-term follow-up raises questions about the durability of the hernia repair without TFS; a long-term study (at least 2-year follow-up) is warranted to verify our initial results.

CONCLUSION

LVHR has several advantages over the open alternative including a faster recovery, less pain, shorter hospital stay, better cosmesis, and a lower rate of recurrence. While the use of tacks is standard in LVHR, TFS is not always used. Our study shows that LVHR is feasible and durable without TFS provided the hernia defect is small. The surgery can be performed on an outpatient basis with minimal postoperative morbidity, even in obese individuals. A larger sample size and long-term follow-up are needed to verify our results.

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